



LINKING AGENT

SEMICONDUCTOR
NANOCRYSTAL COMPOUND

FIGURE 1

SEMICONDUCTOR NANOCRYSTAL

LINKING AGENT AFFINITY MOLECULE

SEMICONDUCTOR NANOCRYSTAL PROBE

FIGURE 2

SEMICONDUCTOR NANOCRYSTAL

LINKING AGENT AFFINITY MOLECULE

DETECTABLE SUBSTANCE

SEMICONDUCTOR NANOCRYSTAL PROBE

FIGURE 3

LINKING TOGETHER ONE OR MORE SEMICONDUCTOR NANOCRYSTALS CAPABLE OF PROVIDING A DETECTABLE SIGNAL AND

ONE OR MORE LINKING AGENTS CAPABLE OF ALSO LINKING TO ONE OR MORE AFFINITY MOLECULES;
AND

LINKING TOGETHER ONE OR MORE AFFINITY MOLECULES CAPABLE OF SELECTIVELY BONDING WITH ONE OR MORE DETECTABLE SUBSTANCES

AND

THE ONE OR MORE LINKING AGENTS LINKED TO THE ONE OR MORE SEMICONDUCTOR NANOCRYSTALS;

TO THEREBY FORM A SEMICONDUCTOR
NANOCRYSTAL PROBE CAPABLE OF BONDING
TO ONE OR MORE DETECTABLE SUBSTANCES
IN A MATERIAL, AND CAPABLE OF PROVIDING
A DETECTABLE SIGNAL IN RESPONSE TO
EXPOSURE TO ENERGY TO INDICATE THE
PRESENCE OF SUCH ONE OR MORE
DETECTABLE SUBSTANCES

DETERMINING THE PRESENCE OF ONE OR MORE DETECTABLE SUBSTANCES IN A BIOLOGICAL MATERIAL BY CONTACTING THE BIOLOGICAL MATERIAL WITH A SEMICONDUCTOR NANOCRYSTAL PROBE COMPRISING:

- 1. ONE OR MORE SEMICONDUCTOR NANOCRYSTALS CAPABLE OF PROVIDING A DETECTABLE SIGNAL IN RESPONSE TO EXPOSURE TO ENERGY;
 - 2. ONE OR MORE AFFINITY MOLECULES CAPABLE OF BONDING TO THE ONE OR MORE DETECTABLE SUBSTANCES; AND
- 3. ONE OR MORE LINKING AGENTS CAPABLE OF LINKING TO BOTH THE ONE OR MORE SEMICONDUCTOR NANOCRYSTALS AND THE ONE OR MORE AFFINITY MOLECULES

OPTIONALLY REMOVING FROM THE BIOLOGICAL MATERIAL ANY SEMICONDUCTOR NANOCRYSTAL PROBE NOT BONDED TO THE ONE OR MORE DETECTABLE SUBSTANCES

EXPOSING THE BIOLOGICAL MATERIAL TO ENERGY CAPABLE OF CAUSING THE SEMICONDUCTOR NANOCRYSTAL PROBE BONDED TO THE ONE OR MORE DETECTABLE SUBSTANCES IN THE MATERIAL TO PROVIDE A DETECTABLE SIGNAL IN RESPONSE TO SUCH ENERGY

DETECTING THE DETECTABLE SIGNAL FROM THE SEMICONDUCTOR NANOCRYSTAL PROBE INDICATING THE PRESENCE IN THE BIOLOGICAL MATERIAL OF THE ONE OR MORE DETECTABLE SUBSTANCES BONDED TO THE PROBE TRANSFERRING ENERGY TO A PROXIMAL STRUCTURE IN A BIOLOGICAL MATERIAL CONTAINING ONE OR MORE DETECTABLE SUBSTANCES BY CONTACTING THE BIOLOGICAL MATERIAL WITH A SEMICONDUCTOR NANOCRYSTAL PROBE COMPRISING:

- 1. ONE OR MORE SEMICONDUCTOR
 NANOCRYSTALS WHICH, IN RESPONSE TO
 EXPOSURE TO A FIRST ENERGY, ARE CAPABLE
 OF TRANSFERRING A SECOND ENERGY TO A
 PROXIMAL STRUCTURE;
 - 2. ONE OR MORE AFFINITY MOLECULES CAPABLE OF BONDING TO THE ONE OR MORE DETECTABLE SUBSTANCES;
- 3. ONE OR MORE LINKING AGENTS CAPABLE OF LINKING TO BOTH THE ONE OR MORE SEMICONDUCTOR NANOCRYSTALS AND THE ONE OR MORE AFFINITY MOLECULES

OPTIONALLY REMOVING FROM THE BIOLOGICAL MATERIAL ANY SEMICONDUCTOR NANOCRYSTAL PROBE NOT BONDED TO THE ONE OR MORE DETECTABLE SUBSTANCES

EXPOSING THE BIOLOGICAL MATERIAL
TO THE FIRST ENERGY CAPABLE OF CAUSING
THE SEMICONDUCTOR NANOCRYSTAL PROBE
BONDED TO THE ONE OR MORE DETECTABLE
SUBSTANCES IN THE MATERIAL TO TRANSFER
THE SECOND ENERGY TO A PROXIMAL
STRUCTURE IN RESPONSE TO SUCH FIRST
ENERGY

TRANSFERRING THE SECOND ENERGY FROM THE SEMICONDUCTOR NANOCRYSTAL PROBE TO A PROXIMAL STRUCTURE IN RESPONSE TO EXPOSURE TO THE FIRST ENERGY